sensitive and operates upon a negligible electrical current, further comprises the step of integrating ~~interfacing~~ said ferromagnetic runner and said coil structure utilizing an interfacing circuit to thereby produce said magnetic sensor for magnetically sensing said target.

REMARKS

I. Objections

The Examiner objected to claims 1, 10, and 13 for not containing a definition of "anisotropic shape". The Examiner argued that as is well known in the art, shape anisotropy is a property of any ferromagnetic material, the shape affecting the magnetization of the material differently in different directions (citing Van Dover et al, Magnetic Materials, pages 3-4). The Examiner asserted that neither the claims nor the specification provide what is the "anisotropic shape" of the ferromagnetic runner as recited in the claims. The Examiner stated that appropriate correction is required. The Examiner also argued that since any ferromagnetic material has shape anisotropy, the claims will be interpreted to mean that any ferromagnetic material, such as the recited runner, has an anisotropic shape.

The Applicant respectfully disagrees with this assessment and notes that claims 1, 10 and 13 have been amended to delete the term "anisotropic shape" and replace it with the term "shape anisotropy," which is discussed in Applicant's specification (see paragraph 0025 of Applicant's specification), thereby enabling claims 1, 10 and 13.

The Applicant notes that the term "shape anisotropy" is a particular term utilized in the magnetic arts. Like all natural systems, a magnet, in the absence of constraints, will try to maintain its magnetization in a direction such as to minimize stored energy; *i.e.,* to make the demagnetizing field as small as possible. To rotate the magnetization away from this minimum-energy position requires work to be done to provide the increase in energy stored in the increased demagnetizing field. Thus, if an attempt is made to rotate the magnetization of a domain away from its

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natural minimum-energy position, the rotation can be said to be hindered in the sense that work must be done by an applied field to promote the rotation against the demagnetizing forces. This phenomenon is often called shape anisotropy because it arises from the domain's geometry which may, in turn, be determined by the overall shape of the specimen. (See Encyclopedia Britannica Online, **http://www.minidisc.org/eb/magnet.htm**, for a general discussion of magnetic principals and shape anisotropy).

Based on the foregoing, the Applicant submits that due to the amendment to claims 1, 10, and 13, the Examiner's objection to claims 1, 10, and 13 have been traversed and/or alternatively, rendered moot. Withdrawal of the objection to claims 1, 10 and 13 is respectfully requested.

The Examiner objected to claim 4 because of the following informalities: "said interfacing circuit" lacks antecedent basis. The Examiner argued that the interfacing circuit is introduced in claim 3. The Examiner stated that amending the claim to depend from claim 3 would overcome the objection. The Applicant has therefore amended claim 4 to depend from claim 3. As such, the Applicant submits that the objection to claim 4 has been traversed. The Applicant respectfully requests withdrawal of the objection to claim 4.

The Examiner objected to claim 20, arguing that it contains features inconsistent with the specification. The Examiner argued that the claim recites interfacing the runner and coil utilizing an interfacing circuit. The Examiner argued that as recited in the specification in paragraph 0023, the interfacing circuit is implemented by integrating the runner and coil. The Examiner asserted that the claim essentially recites utilizing an integrated runner and coil to interface the runner and coil, arguing that this is an apparently circuit operation, and asserting that this not taught or discussed in the specification.

The Applicant respectfully disagrees with this assessment and notes that claim 20 as now amended overcomes the Examiner's objection. Claim 20 has been amended to refer to the step of interfacing said ferromagnetic runner and said coil structure to thereby produce a magnetic sensor for magnetically sensing said target, wherein said magnetic sensor is highly sensitive and operates upon a

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negligible electrical current, further comprises the step of Integrating said ferromagnetic runner and said coil structure utilizing an interfacing circuit to thereby produce said magnetic sensor for magnetically sensing said target. This amendment is consistent with and enabled by Applicant's specification. Applicant's paragraph [0023] states that "..an interfacing circuit can be implemented in which the permalloy runner 100 and the coil 304 are integrated to thereby produce a magnetic sensor for magnetically sensing a target, wherein the magnetic sensor is highly sensitive and operates upon a negligible electrical current." Thus, the Applicant submits that the objection to claim 20 has been traversed. The Applicant respectfully requests withdrawal of the aforementioned objection to claim 20.

II. Claim Rejections – 35 U.S.C. § 102

Requirements for Prima Facie Anticipation

A general definition of *prima facie* unpatentability is provided at 37 C.F.R. §1.56(b)(2)(ii):

> A *prima facie* case of unpatentability is established when the information *compels a conclusion* that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability. (*emphasis added*)

"Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration." *W.L. Gore & Associates v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983) (citing *Soundscriber Corp. v. United States*, 360 F.2d 954, 960, 148 USPQ 298, 301 (Ct. Cl.), *adopted*, 149 USPQ 640 (Ct. Cl. 1966)), *cert. denied*, 469 U.S. 851 (1984). Thus, to anticipate the applicants' claims, the reference cited by the Examiner must disclose each element recited therein. "There must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention." *Scripps Clinic & Research Foundation v. Genentech, Inc.*, 927 F.2d 1565, 18 USPQ 2d 1001, 1010 (Fed. Cir. 1991).

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To overcome the anticipation rejection, the applicants need only demonstrate that not all elements of a *prima facie* case of anticipation have been met, *i.e.*, show that the reference cited by the Examiner fails to disclose every element in each of the applicants' claims. "If the examination at the initial state does not produce a prima face case of unpatentability, then without more the applicant is entitled to grant of the patent." *In re Oetiker*, 977 F.2d 1443, 24 USPQ 2d 1443, 1444 (Fed. Cir. 1992).

Bosch

Claims 1-4, 6-16 and 18-20 were rejected by the Examiner under 35 U.S.C. 102(b) as being anticipated by Bosch (German Patent DE3420709). The Examiner argued that Bosch discloses a magnetic sensor comprising a permalloy runner having an anisotropic shape and locatable relative to a target (citing Bosch FIGS. 1-3, item 15), and a single coil structure tightly wound about the ferromagnetic runner (citing FIGS. 1-3, item 14), the coil comprising a plurality of interconnecting metals for integrating the runner the coil with an interfacing circuit (citing FIGS. 2 and 3), further comprising a conductive semi-conductive layer beneath the runner and an insulated metal to integrate the runner and coil (citing FIGS. 2 and 3).

The Examiner also argued that the remaining portions of claims 1, 2, 8, 10, 11, 12, 13, 14, 19, and 20 are directed to properties of the above noted structure. In support of this argument the Examiner stated that a coil is wound about a permalloy core and asserted by way of example that the feature "when a magnetic field changes direction along an axial length of the runner, voltage is induced in the coil proportional to a time change of the magnetic flux thereof" is based on Faraday's Law, which states that

Emf = V = -[{change in flux} / {change in time}],

when the area to which the magnetic flux is applied is constant:

V=-Area*[{magnetic field change}/{change in time}]

And for an inductor with N number of turns, this equation becomes

V=-N*Area*[{magnetic field change}/{change in time}]

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Regarding the recited features of "producing a sudden change in a magnetization vector thereof to create a large time rate of change of magnetic flux density and enable sensing operations by said magnetic sensor"; "producing a voltage spike amplitude for an interfacing circuit induced therein when said magnetic field changes direction along said axial length of said ferromagnetic runner"; and wherein "said magnetic sensor is highly sensitive and operate upon a negligible electrical current", the Examiner asserted that these features are merely properties of a sensor comprising a coil surrounding a permalloy cure as described by Applicant in the specification

The Examiner asserted that because Bosch discloses the structures described and claimed by Applicant in the specification and claims, the apparatus of Bosch has the properties of the structures as noted by Applicant, and that Bosch anticipates the claimed invention.

The Applicant respectfully disagrees with this assessment. Amended claim 1 of Applicant's specification teaches a magnetic sensor composed of the following claim limitations: a ferromagnetic runner having a shape anisotropy and locatable relative to a target, wherein said ferromagnetic runner comprises a permalloy material; and a coil structure wound about said ferromagnetic runner, such that when a magnetic field changes direction along an axial length of said ferromagnetic runner, a voltage is induced in said coil structure that is proportional to a time range of change of a magnetic flux thereof, thereby producing a sudden change in a magnetization vector thereof to create a large time rate of change of magnetic flux density and enable magnetic sensing operations by said magnetic sensor.

The Examiner has cited FIGS. 1-3 and items 14, 15, but has not identified which aspects of Bosch disclose a ferromagnetic runner having a shape anisotropy. The Examiner cited reference numeral 15 of Bosch, which refers to a "Dünnschichtkern". In English, the term "Dünnschichtkern" is translated as "thin section core," which is not the same as a "ferromagnetic runner having a shape anisotropy". Where is the term "shape anisotropy" disclosed by Bosch? Where is a "ferromagnetic runner" disclosed by Bosch? How is a "thin section core" the same type of device as a "ferromagnetic runner" as taught by Applicant's invention? The

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term "shape anisotropy" as discussed earlier has a particular meaning, which does not appear in Bosch. The Examiner has not identified which aspects of Bosch disclose shape anisotropy and ferromagnetic runner. Reference numeral 14 of Bosch refers to a "Spule," which translates into English as a "reel". How does a "reel" constitute either a ferromagnetic run or a coil structure?

Applicant's claim 1 also refers to a "target". Where is such a target disclosed by Bosch? Applicant's claim 1 also teaches a voltage induced in a coil structure. Where does Bosch disclose a voltage induced in a coil structure? Where does Bosch disclose "proportional to a time range of change of a magnetic flux thereof" and "producing a sudden change in a magnetization vector thereof to create a large time rate of change of magnetic flux density and enable magnetic sensing operations by said magnetic sensor". Where does Bosch disclose such claim limitations. The Examiner has merely cited Faraday's law without explaining how all of the aforementioned claim limitations of Applicant's amended claim 1 are disclosed by Bosch.

The Applicant reminds the Examiner that in order to set forth a rejection to a claim or set of claims under 35 U.S.C. 102 based on a reference (in this case, Bosch), the reference utilized as a basis for the rejection must disclose each and every claim limitation of the rejected claim. If even one claim limitation is lacking in the cited reference, the rejection under 35 U.S.C. 102 fails, and thus does not satisfy the prima facie anticipation test described above. In this case, as indicated above, the Bosch reference cited by the Examiner fails to disclose every element in Applicant's claim 1. Based on the foregoing, the Applicant submits that the rejection to claim 1 has been traversed. The Applicant submits that the arguments presented above against the rejection to claim 1 based on Bosch under 35 U.S.C. 102 apply equally to the rejection to claims 2-4, 6-16 and 18-20. As such, the Applicant respectfully requests withdrawal of the foregoing rejection to Applicant's claims 1-4, 6-16 and 18-20.

The Applicant notes that claim 2 is directed toward the claim limitation of wherein said coil structure is wound tightly about said ferromagnetic runner, such that said coil structure possesses a number of turns thereof, which is sufficient to

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achieve a voltage spike amplitude for an interfacing circuit induced therein when said magnetic field changes direction along said axial length of said ferromagnetic runner. The Examiner has not identified which sections of Bosch disclose each of the claim limitations of claim 2. For example, where and how does Bosch disclose an interfacing circuit as taught by Applicant's invention? Applicant's claim 3 includes the claim limitation of a plurality of interconnecting metals for integrating said ferromagnetic runner and said coil structure with an interfacing circuit. The Examiner has not identified which aspects of Bosch disclose all of the claim limitations of Applicant's claim 3.

Similarly, Applicant's claim 4, which is dependent upon claim 3, is directed toward the claim limitations of a conductive semiconductor layer located beneath said ferromagnetic runner and an insulated metal to thereby integrate said ferromagnetic runner and said coil structure with said interfacing circuit. The Examiner has not identified where and how Bosch discloses all of the claim limitations of Applicant's claim 4 in combination with all of the claim limitations of Applicant's claim 3.

Regarding Applicant's claim 6, Bosch does not disclose the claim limitations of the structure comprising a single coil tightly wound about said ferromagnetic runner. As indicated earlier, a "reel" is not a coil structure as taught by Applicant's invention. Additionally, Bosch provides no evidence of "tightly wound". Regarding Applicant's claim 7, the Examiner has not identified all of the following claim limitations in Bosch: a ferromagnetic runner comprising a magnetoresistive material. Where and how does Bosch teach a magnetoresistive material?

Regarding Applicant's claim 8, Bosch does not disclose the claim limitations of an interfacing circuit for interfacing said ferromagnetic runner and said coil structure, wherein said ferromagnetic runner and said coil structure are integrated with said interfacing circuit to thereby produce a magnetic sensor for magnetically sensing said target, wherein said magnetic sensor is highly sensitive and operates upon a negligible electrical current. Where is the interfacing circuit as taught by Applicant's invention disclosed by Bosch?

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Regarding Applicant's claim 9, Bosch does not disclose the claim limitations of wherein said voltage induced in said coil structure is equivalent to a number of turns of said coil structure multiplied by a cross sectional area of said ferromagnetic runner multiplied by a rate of change of said magnetic flux with respect to a change of time. Where and how are all of the claim limitations of Applicant's claim 9 taught by Bosch?

Regarding Applicant's claim 10, Bosch does not disclose all of the following claim limitations: a permalloy magnetic sensor, comprising: a permalloy runner having a shape anisotropy and locatable relative to a target; a single coil wound about said permalloy runner, such that when a magnetic field changes direction along an axial length of said permalloy runner, a voltage is induced in said single coil that is proportional to a time range of change of a magnetic flux thereof; a plurality of interconnecting metals for integrating said permalloy runner and said coil with said interfacing circuit; and wherein said single coil is wound tightly about said permalloy runner, such that said single coil possesses a number of turns thereof, which is sufficient to achieve a voltage spike amplitude induced at said interfacing when said magnetic field changes direction along said axial length of said permalloy runner, wherein said magnetic sensor is highly sensitive and operates upon a negligible current, thereby producing a sudden change in a magnetization vector thereof to create a large time rate of change of magnetic flux density and enable magnetic sensing operations by said magnetic sensor. The Applicant has not identified which aspects of Bosch disclose all of the aforementioned claim limitations of Applicant's claim 10.

Regarding Applicant's claim 11, the Applicant notes that Bosch does not teach all of the following claim limitations: an interfacing circuit for interfacing said permalloy runner and said coil structure, wherein said permalloy runner and said coil structure are integrated with said interfacing circuit to thereby produce a magnetic sensor for magnetically sensing said target, wherein said magnetic sensor is highly sensitive and operates upon a negligible electrical current. The Examiner has not identified which aspects of Bosch disclose each and every claim limitation of Applicant's claim 11.

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Regarding Applicant's claim 12, the Applicant notes that Bosch does not teach all of the following claim limitations: wherein said voltage induced in said coil structure is equivalent to a number of turns of said coil structure multiplied by a cross sectional area of said permalloy runner multiplied by a rate of change of said magnetic flux with respect to a change of time. The Examiner has not identified which aspects of Bosch disclose each and every claim limitation of Applicant's claim 12.

Regarding Applicant's claim 13, the Applicant note that Bosch does not teach all of the following claim limitations: a magnetic sensor method, comprising the steps of: winding a coil structure about a ferromagnetic runner having a shape anisotropy such that when a magnetic field changes direction along an axial length of said ferromagnetic runner, a voltage is induced in said coil structure that is proportional to a time range of change of a magnetic flux thereof, wherein said ferromagnetic runner comprises a permalloy runner; and interfacing said ferromagnetic runner and said coil structure to thereby produce a magnetic sensor for magnetically sensing a target, wherein said magnetic sensor is highly sensitive and operates upon a negligible electrical current, thereby producing a sudden change in a magnetization vector thereof to create a large time rate of change of magnetic flux density and enable magnetic sensing operations by said magnetic sensor. The Examiner has not explained where and how Bosch discloses each and every claim limitation of Applicant's claim 13.

Regarding Applicant's claim 14, the Examiner has not identified where and how Bosch discloses each of the following claim limitations: wherein said coil structure is wound tightly about said ferromagnetic runner, such that said coil structure possesses a number of turns thereof, which is sufficient to achieve a voltage spike amplitude for said interfacing circuit induced therein when said magnetic field changes direction along said axial length of said ferromagnetic runner.

Regarding Applicant's claim 15, the Examiner has not explained where and how Bosch discloses all of the following claim limitations: providing a plurality of

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interconnecting metals for integrating said ferromagnetic runner and said coil structure with said interfacing circuit.

Regarding Applicant's claim 16, the Examiner has not explained where and how Bosch discloses all of the following claim limitations: locating a conductive semiconductor layer located said ferromagnetic runner and an insulated metal to thereby integrate said ferromagnetic runner and said coil structure with said interfacing circuit. Regarding Applicant's claim 18, the Examiner has not identified in Bosch a single coil tight wound about the ferromagnetic runner.

Regarding Applicant's claim 19, the Examiner has not explained where and how Bosch discloses all of the following claim limitations: wherein said voltage induced in said coil structure is equivalent to a number of turns of said coil structure multiplied by a cross sectional area of said ferromagnetic runner multiplied by a rate of change of said magnetic flux with respect to a change of time.

Regarding Applicant's claim 20, the Examiner has not explained where and how Bosch discloses all of the following claim limitations: wherein the step of interfacing said ferromagnetic runner and said coil structure to thereby produce a magnetic sensor for magnetically sensing said target, wherein said magnetic sensor is highly sensitive and operates upon a negligible electrical current, further comprises the step of integrating said ferromagnetic runner and said coil structure utilizing an interfacing circuit to thereby produce said magnetic sensor for magnetically sensing said target.

Based on the foregoing, the Applicant submits that the rejection to claims 1-4, 6-16 and 18-20 under 35 U.S.C. 102(b) as being anticipated by Bosch has been traversed. The Applicant respectfully requests withdrawal of the rejection to claims 1-4, 6-16 and 18-20 under 35 U.S.C. 102(b).

III. Claim Rejections – 35 U.S.C. § 103

Requirements for Prima Facie Obviousness

The obligation of the examiner to go forward and produce reasoning and evidence in support of obviousness is clearly defined at M.P.E.P. §2142:

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> The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

M.P.E.P. §2143 sets out the three basic criteria that a patent examiner must satisfy to establish a *prima facie* case of obviousness:

1. some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings;

2. a reasonable expectation of success; and

3. the teaching or suggestion of all the claim limitations by the prior art reference (or references when combined).

It follows that in the absence of such a *prima facie* showing of obviousness by the Examiner (assuming there are no objections or other grounds for rejection), an applicant is entitled to grant of a patent. *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443 (Fed. Cir. 1992). Thus, In order to support an obviousness rejection, the Examiner is obliged to produce evidence compelling a conclusion that each of the three aforementioned basic criteria has been met.

Ramsden

Claims 1, 2, 6, 7, 9, 13, 14, and 18-20 were rejected by the Examiner under 35 U.S.C. 103(a) as being unpatentable over Ramsden (Sensor Applications for Magnetic Materials). Regarding claims 1, 6, 7, 9, 13, 18, and 19, the Examiner argued that Ramsden discloses a magnetic sensor comprising a permalloy runner having an anisotropic shape and locatable relative to a target (citing Ramsden, pages 3-4, FIG. 8 and arguing that the permalloy core and the magnetic field applied to the sensor would be provided by a magnetic field generator readable as a target), and a coil structure tightly wound about the ferromagnetic runner (citing the same figure of Ramsden).

The Examiner argued that the remaining portions of claims 1, 2, 6, 7, 9, 13, 14, 18, 19 and 20 are directed to properties of the are directed to properties of the

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above noted structure. In support of this argument the Examiner stated that a coil is wound about a permalloy core and asserted by way of example that the feature "when a magnetic field changes direction along an axial length of the runner, voltage is induced in the coil proportional to a time change of the magnetic flux thereof" is based on Faraday's Law, which states that

Emf = V = -[{change in flux} / {change in time}],

when the area to which the magnetic flux is applied is constant:

V=-Area*[{magnetic field change}/{change in time}]

And for an inductor with N number of turns, this equation becomes

V=-N*Area*[{magnetic field change}/{change in time}]

Regarding the recited features of "producing a sudden change in a magnetization vector thereof to create a large time rate of change of magnetic flux density and enable sensing operations by said magnetic sensor"; "producing a voltage spike amplitude for an interfacing circuit induced therein when said magnetic field changes direction along said axial length of said ferromagnetic runner"; and wherein "said magnetic sensor is highly sensitive and operate upon a negligible electrical current", the Examiner asserted that these features are merely properties of a sensor comprising a coil surrounding a permalloy cure as described by Applicant in the specification

The Examiner argued that because Ramsden discloses the structure described and claimed by the Applicant in the specification and claims, the apparatus of Ramsden has the properties of the structure as noted by Applicant, and therefore Bosch (?) anticipates (?) the features recited in the claims.

The Examiner respectfully disagrees with this assessment and notes that the Examiner has referred to Bosch with regard to the 103 rejection based on Ramsden and has also argued "anticipates" with respect to a 103 rejection, which is improper because anticipation is a basis for a 102 rejection not a 103 rejection.

The Applicant submits that all of the arguments provided above against the rejection to claims 1-4, 6-16 and 18-20 under 35 U.S.C. 102(b) as being anticipated by Bosch apply equally to the rejection to the rejection to claims 1, 2, 6, 7, 9, 13, 14, and 18-20 were rejected by the Examiner under 35 U.S.C. 103(a) as being

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unpatentable over Ramsden. The Applicant notes that Ramsden does not teach all of the claim limitations of Applicant's claims 1, 2, 6, 7, 9, 13, 14, and 18-20.

Claim 1 is directed toward magnetic sensor, comprising all of the following claim limitations: a ferromagnetic runner having a shape anisotropy and locatable relative to a target, wherein said ferromagnetic runner comprises a permalloy material; and a coil structure wound about said ferromagnetic runner, such that when a magnetic field changes direction along an axial length of said ferromagnetic runner, a voltage is induced in said coil structure that is proportional to a time range of change of a magnetic flux thereof, thereby producing a sudden change in a magnetization vector thereof to create a large time rate of change of magnetic flux density and enable magnetic sensing operations by said magnetic sensor. The Applicant notes that Ramsden does not teach shape anisotropy and when a magnetic field changes direction along an axial length of said ferromagnetic runner, a voltage is induced in said coil structure that is proportional to a time range of change of a magnetic flux thereof, thereby producing a sudden change in a magnetization vector thereof to create a large time rate of change of magnetic flux density and enable magnetic sensing operations by said magnetic sensor. The Examiner has cited Faraday's law but has not explained how and why Ramsden teaches each and every claim limitation of Applicant's claim 1. The Examiner argued that Ramsden discloses a magnetic sensor comprising a permalloy runner having an anisotropic shape and locatable relative to a target (citing Ramsden, pages 3-4, FIG. 8 and arguing that the permalloy core and the magnetic field applied to the sensor would be provided by a magnetic field generator readable as a target), and a coil structure tightly wound about the ferromagnetic runner (citing the same figure of Ramsden).

Pages 3-4 and FIG. 8 of Ramsden do not mention shape anisotropy nor a target as taught by Applicant's invention, nor a coil structure tightly wound about a ferromagnetic runner. Where is such a coil structure taught by Ramsden? Where is a ferromagnetic runner as taught by Applicant's invention taught by Ramsden? Where are all of the following claim limitations taught by Ramsden: when a magnetic field changes direction along an axial length of said ferromagnetic runner,

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a voltage is induced in said coil structure that is proportional to a time range of change of a magnetic flux thereof, thereby producing a sudden change in a magnetization vector thereof to create a large time rate of change of magnetic flux density and enable magnetic sensing operations by said magnetic sensor?

Applicant's claim 2 provides for all of the following claim limitations: wherein said coil structure is wound tightly about said ferromagnetic runner, such that said coil structure possesses a number of turns thereof, which is sufficient to achieve a voltage spike amplitude for an interfacing circuit induced therein when said magnetic field changes direction along said axial length of said ferromagnetic runner. The Examiner has not identified which components of Ramsden teach all of the claim limitations of Applicant's claim 2 such as, for example, an interfacing circuit as taught by Applicant's invention, magnetic field changes direction along said axial length of said ferromagnetic runner, a coil structure having sufficient turns to achieve a voltage spike amplitude for the interfacing circuit, and so on. Such arguments also apply to the rejection to claims 6, 7, 9, 13, 14, and 18-20.

Based on the foregoing, the Applicant submits that the Examiner's rejection to claims 1, 2, 6, 7, 9, 13, 14, and 18-20 under 35 U.S.C. 103(a) as being unpatentable over Ramsden fails under all three prongs of the aforementioned prima facie obviousness test. First, the Examiner has not provided some suggestion or motivation, in the Ramsden reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the Ramsden reference to teach all of the claim limitations of Applicant's claims 1, 2, 6, 7, 9, 13, 14, and 18-20. Second, the Examiner has not provided a reasonable expectation of success for such a modification. Third, the Examiner has not provided for the teaching or suggestion of all the claim limitations of claims 1, 2, 6, 7, 9, 13, 14, and 18-20 by the Ramsden reference.

Regarding the issue of "motivation" (i.e., the first prong mentioned above), the Applicant reminds the Examiner that the language of the references may not taken out of context and combined them without motivation, in effect producing the words of the claims (and sometimes, not even the words or concepts of the claims), without their meaning or context. The resultant modification would not yield the

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invention as claimed. The claims are rejected under 35 U.S.C. §103(a) and no showing has been made to provide the motivation as to why one of skill in the art would be motivated to make such a modification, and further fails to provide the teachings necessary to fill the gaps in these references in order to yield the invention as claimed. The rejections under 35 U.S.C. §103(a) have provided no more motivation than to simply point out the individual words of the Applicant's claims among the references, but without the reason and result as provided in the Applicant's claims and specification, and without reason as to why and how the references could provide the Applicant's invention as claimed. Hindsight cannot be the basis for motivation, which is not sufficient to meet the burden of sustaining a 35 U.S.C. §103(a) rejection.

Thus, claims 1, 2, 6, 7, 9, 13, 14, and 18-20 of the present invention are not taught or suggested by Ramsden. Modifying Ramsden fails to teach or yield the invention as claimed. The modification of Ramsden fails to teach or suggest all the elements of the claims. Further, one of skill in the art would not be motivated to make such a modification. Therefore, the present invention is not obvious in light of any modification of Ramsden. Withdrawal of the §103(a) rejection to claims 1, 2, 6, 7, 9, 13, 14, and 18-20 is therefore respectfully requested.

Ramsden in view of Dezuari

The Examiner rejected claims 3, 4, 8, 10-12, and 15-16 under 35 U.S.C. 103(a) as being unpatentable over Ramsden in view of Dezuari et al, hereinafter "Dezuari" (Development of a Novel Printed Circuit Board Technology of Inductive Device Applications). Regarding claims 3, 4, 8, 10-12, and 15-16, the Examiner argued that Ramsden teaches all the features of claims 1 and 13 as discussed above. The Examiner admitted, however, that Ramsden does not explicitly disclose a manufacturing method of the coil design. The Examiner asserted that Dezuari et al teaches methods for interconnecting metals or semiconductor layers located beneath the runner and insulating metal, arguing that both of which are used to create an interface circuit that integrates the runner and the coil. In support of this argument, the Examiner cited Dezuari, page 2, 2.2 fabrication process and noted

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"figures" but did not identify which figures referred to. Based on this argument, the Examiner asserted that it would have been obvious to a person having ordinary skill in the art to apply the fabrication process disclosed in Dezuari to the sensor disclosed in Ramsden. The Examiner asserted that one having ordinary skill in the art would have been motivated to do so to increase the miniaturization of such inductive devices. In support of this argument the Examiner cited Dezuari, page 1, introduction.

Regarding claim 12, the Examiner argued that because Ramsden discloses the structure of claim 10 as argued above, it has the same properties in view of the recitation of Faraday's law noted by the Examiner.

The Applicant respectfully disagrees with this assessment. The Applicant submits that the arguments presented above against the rejection to claims 1, 2, 6, 7, 9, 13, 14, and 18-20 based on Ramsden apply equally to the rejection to claims 3, 4, 8, 10-12, and 15-16 under 35 U.S.C. 103(a) as being unpatentable over Ramsden in view of Dezuari.

The Applicant's claim 3 is directed toward a plurality of interconnecting metals for integrating said ferromagnetic runner and said coil structure with an interfacing circuit. Page 2, 2.2 of Dezuari makes no mention of an interfacing circuit as taught by Applicant's invention. Structurally, Dezuari also does not provide for a teaching of all the claim limitation of Applicant's claims 3 and 1. Similarly, Dezuari does not provide for a teaching of each and every claim limitation of Applicant's claims 4, 8, 10-12, and 15-16. The Examiner has not identified specific features of Dezuari which teach specific claim limitations of Applicant's claims 3, 4, 8, 10-12, and 15-16.

The Applicant submits that the Examiner's rejection to claims 3, 4, 8, 10-12, and 15-16 under 35 U.S.C. 103(a) as being unpatentable over Ramsden/Dezuari fails under all three prongs of the aforementioned prima facie obviousness test. First, the Examiner has not provided some suggestion or motivation, in the Ramsden/Dezuari references or in the knowledge generally available to one of ordinary skill in the art, to combine the Ramsden and Dezuari references to teach all of the claim limitations of Applicant's claims 3, 4, 8, 10-12, and 15-16. Second,

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the Examiner has not provided a reasonable expectation of success for such a modification. Third, the Examiner has not provided for the teaching or suggestion of all the claim limitations of claims 3, 4, 8, 10-12, and 15-16 by the Ramsden and Dezuari references.

Regarding the issue of "motivation" (i.e., first prong) the Applicant again reminds the Examiner that the language of the references may not taken out of context and combined them without motivation, in effect producing the words of the claims (and sometimes, not even the words or concepts of the claims), without their meaning or context. The resultant combination would not yield the invention as claimed. The claims are rejected under 35 U.S.C. §103(a) and no showing has been made to provide the motivation as to why one of skill in the art would be motivated to make such a combination, and further fails to provide the teachings necessary to fill the gaps in these references in order to yield the invention as claimed. The rejections under 35 U.S.C. §103(a) have provided no more motivation than to simply point out the individual words of the Applicant's claims among the references, but without the reason and result as provided in the Applicant's claims and specification, and without reason as to why and how the references could provide the Applicant's invention as claimed. Hindsight cannot be the basis for motivation, which is not sufficient to meet the burden of sustaining a 35 U.S.C. §103(a) rejection.

Thus, claims 3, 4, 8, 10-12, and 15-16 of the present invention are not taught or suggested by Ramsden and/or Dezuari Combining these references fails to teach or yield the invention as claimed. The combination of these references fails to teach or suggest all the elements of the claims. Further, one of skill in the art would not be motivated to make such a combination. Therefore, the present invention is not obvious in light of any combination of Ramsden and/or Dezuari. Withdrawal of the §103(a) rejection to claims 3, 4, 8, 10-12, and 15-16 is therefore respectfully requested.

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IV. Invention Features

The claims have been amended as indicated herein. In order to explain the unique features to which such claims are directed, the Applicants believe it would be helpful to elaborate in greater detail, the concept behind the present invention.

Essentially, it is well known that a time varying magnetic field can create a voltage in a coil. This effect is known as the Faraday effect, and is well known to one reasonably skilled in the art. Specifically,

$$V = n * A * \frac{\partial B}{\partial t}$$

The general, linear relationship between the magnetic flux density (B) and the magnetic flux intensity (H) is B = μH, where μ is the permeability of the material. The Faraday effect device is generally known as a transformer. One should note the time varying portion of the equation. In an ideal transformer, the frequency of the input and output is the same. Also, the frequency of B and H are the same. In electrical power, for example, 60 Hz is the input and output frequency.

Further, it is also known that:

$$\vec{B} = \mu * \vec{H} + \vec{M}$$

Whereas the magnetization vector (M) is a property of the material. In some materials and configurations, such as Permalloy thin films, the magnetization vector may exist in only one of two different possible states. The transition from one state to the other (such as shown in the transition in Applicants' Figures 1 & 2) occurs very quickly (a few nanoseconds), and thus the frequency is very high (several

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hundred MHz). The time component of M is not dependent on the frequency of the input signal. Thus, M(t) is not related to H(t). For example, if you put 60 Hz of H to the device, M will be 100's of MHz. With H at 1 MHz, M will still be 100's of MHz. And, since the voltage is proportional to the time derivative of B, the voltage will be small from a 60 Hz H field, and large (but for a very short period of time) from the M portion. The references cited by the Examiner utilize slow changes in H whereas this invention is utilizing a material that can produce a sudden flip in M (large dM/dt) to create a large dB/dt.

Thus, as indicated, for example, in Applicants' amended claim 1, a magnetic sensor is provided that includes a ferromagnetic runner having a shape anisotropy and locatable relative to a target, wherein the ferromagnetic runner comprises a permalloy material; and a coil structure wound about the ferromagnetic runner, such that when a magnetic field changes direction along an axial length of the ferromagnetic runner, a voltage is induced in the coil structure that is proportional to a time range of change of a magnetic flux thereof, thereby producing a sudden change in a magnetization vector thereof to create a large change in magnetic flux density and enable magnetic sensing operations by the magnetic sensor. Thus, such claim limitations are directed toward a device that utilizes a material that can produce a sudden flip in M (large dM/dt) to create a large dB/dt.

V. Conclusion

The Applicants have amended the claims to more particularly claim the invention. Support for the amendments is provided within the specification, and the specification adequately enables such amendments. It is believed that such amendments do not constitute new matter, but are clarifying in nature.

In view of the foregoing discussion, the Applicants respectfully request that a timely Notice of Allowance be issued.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned representative to conduct an interview in an effort to expedite

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prosecution in connection with the present application. If a telephone conference would be of assistance in advancing the prosecution of this application, the Examiner is invited to call the Applicants' attorney at the below-indicated telephone number.

Respectfully submitted,

Dated: February 2, 2006

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